

**REMARKS**

Claims 8-40 are currently pending in the above application. Claims 41-55 are added by the foregoing amendment.

As previously stated, claims 41-55 are added by the foregoing amendment. Support for each of these claims is found on page 8, lines 12-18 of the originally filed parent application and thus do not constitute new matter. In addition, it is respectfully noted that each limitation added by the newly present claims is believed to be unique over the cited references listed below. Consideration of new claims 41-55 is respectfully requested.

In the Office Action, Claims 8-21, 23, 25-31, 33 and 35-40 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Garg et al. (U.S. Patent No. 4,902,535) in view of Tate (Japanese Patent No. 61035868) and further in view of Malaczynski et al. (U.S. Patent No. 5,458,927) and further in view of in view of Potter et al. (U.S. Patent No. 5,783,261). Applicants respectfully traverse the Examiner's rejection.

Garg et al. discloses a coated substrate product that comprises a titanium or titanium alloy substrate, at least one thin interlayer of a noble metal interlayer, and a hard outer coating. As the Examiner indicates, Garg et al. does not teach the application of a hard-carbon coating to an aluminum surface of a bell cup, the preparation of the surface, nor does Garg et al. teach the use of tetramethylsilane to form the silicon-doped coating.

Tate describes a nitride hardening surface treatment for an aluminum rotary atomizer in order to improve abrasion resistance. As one of ordinary skill in the art recognizes, a nitride hardening treatment is not the equivalent of a wear resistant coating applied to an outer surface. A nitride hardening treatment involves a two-step

process. First, the outer surface is reacted with hydrogen in an oxygen free environment. After the hydrogen exposure, nitrogen ions react with the surface of the aluminum to form chemical bonds with the aluminum. A nitride hardening treatment is thus best described as a surface modification treatment.

Potter et al. describes a method of using a coated fuel injector to extend the operating life of the steel surfaces of a fuel injector. Potter does describe a degreasing step prior to an etching and coating step of a steel surface of a needle and valve that includes the use of soap, potassium hydroxide and water acetone rinse, a nitric acid etch and alcohol. Potter does not describe an atomic cleaning step as part of the preparation of the outer surface of the part prior to coating. Potter is also not used on aluminum or titanium surfaces.

Malaczynski et al. describes a process for forming a diamond-like carbon coating on a workpiece, preferably automobile components such as pistons, and includes successive immersion steps in different plasma atmospheres to clean the surface of oxygen atoms. Malaczynski then implants a carbide compound while codepositing a carbonaceous layer on the surface, bombards and removes the carbonaceous layer, and to thereafter deposits an amorphous hydrogen containing carbon layer. Malaczynski does not teach a step of preparing the outer surface including a cleaning, etching, and rinsing step prior to an atomic cleaning step. Malaczynski also requires an implantation of a carbide compound step and codepositing of a carbonaceous layer prior to the argon bombardment step that the present invention does not require.

The Examiner asserts that it would have been obvious to use the carbon coating treatment of carbon coating titanium treatment of Garg et al. to an aluminum or titanium bell cup to improve wear-resistance as taught by Malaczynski and Tate. Applicants respectfully disagree.

Section 2143 of the Manual of Patent Examining Procedure states that three basic criteria must be met for establishing a *prima facie* case of obviousness, stating:

"First, there must some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach all of the claim limitations."

"If the examiner does not establish a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness." Section 2142 MPEP, ch. 2100, p. 110. "When the references cited by the Examiner fail to establish a *prima facie* case of obviousness, the rejection is improper and will be overturned."<sup>1</sup> One cannot use hindsight reconstruction, picking and choosing among isolated disclosures in the prior art, to deny that the claimed invention is unobvious.<sup>2</sup>

Here, the Examiner has not established a *prima facie* case of obviousness because the combination of references does not disclose or suggest all of the limitations as contained in independent claims 8, 16, 25 or, alternatively, that there is no motivation to combine the references, contrary to the Examiner's analysis.

Specifically, with regard to independent claim 8, the combination of references does not disclose the application of wear resistant coating applied to the outer surface of an aluminum bell cup. Garg et al. is not directed at aluminum bell cup. Further, Garg et al. does not apply a wear resistant coating directly to the surface of the aluminum bell cup, but instead applies a coating to a noble layer intermediate, which is

---

<sup>1</sup> *In re Ochiai*, 71 F.3d 1565, 37 U.S.P.Q.2d 1127 (Fed. Cir. 1995), citing *In re Fine*, 837 F.2d 1071, 1075, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988).

U.S.S.N. 10/057,081

16

FGT 1622 PA (199-0868)

used to improve adhesion of the coating. As stated in previous Responses, Malaczynski similarly does not apply a wear resistant coating directly to the aluminum surface, but requires the implanting of a carbide compound prior to the application of the coating, which the present invention does not require. Tate does not teach the addition of a wear resistant coating, but instead teaches a nitride hardening treatment. Finally, Potter teaches degreasing a steel surface before applying a coating in automotive applications, but does not teach applying a coating to an aluminum bell cup. Since none of the references teaches the invention as described in independent claim 8, it is allowable over the cited art. Further, dependent claims 9-15 and 35-36, and newly added dependent claims 41-45, are allowable as well. Reconsideration of claims 8-15, 35-36 and 41-45 is respectfully requested.

Similarly, with regard to claim 16, none of the combined references teaches preparing the outer surface of a titanium bell cup, applying an adhesion promoter coating to the outer surface, and applying a wear resistant coating to the adhesion promoter. Garg et al. discloses a thin layer noble metal intermediate applied to the surface of the titanium bell cup and coated with a hard carbon coating. As one of ordinary skill recognizes, noble metals include Cu, Ag, Au, Pt, Pd, and sometimes Ir (Garg also lists other non reactive metals in Column 6, lines 26-30). It does not include an adhesion promoter such as chrome. Further, none of the other reference specifically teaches an adhesion promoter. As such, none of the references discloses or suggests the invention as disclosed in independent claim 16. Further, dependent claims 17-24, 37-38, and 46-50 are allowable as well. Reconsideration of claims 16-24, 37-38, and dependent claims 46-50 is respectfully requested.

With regard to claim 25, the combination of references does not disclose the application of a wear resistant coating applied directly to the outer surface of spray application equipment. As stated previously, Garg et al. does not apply a wear resistant

---

2 In re Fine, 837 F.2d at 1075.

coating directly to the surface of spray application equipment, but instead applies a coating to a noble layer intermediate, which is used to improve adhesion of the coating. As stated in previous Responses, Malaczynski similarly does not apply a wear resistant coating directly to the surface, but requires the implanting of a carbide compound prior to the application of the coating, which the present invention does not require. Tate does not teach the addition of a wear resistant coating, but instead teaches a nitride hardening treatment. Finally, Potter teaches degreasing a steel surface before applying a coating in automotive applications, but does not teach applying a coating to a piece of spray application equipment. Since none of the references discloses or suggests the invention as described in independent claim 27, it is allowable over the cited art. Further, dependent claims 28-34 and 39-40, and newly added dependent claims 51-55, are allowable as well. Reconsideration of claims 27-34 and 39-40 and 51-55 is respectfully requested.

Regarding the rejection of claims 24 and 32 as stated in Paragraph 5 of the Office Action, Applicants respectfully traverse the Examiner's rejection.

Kohler discloses a process of plasma deposition of a carbon rich coating on a polymeric and flexible substrate (see column 2, lines 28-34) for magnetic recording media. As indicated in column 6, the composition of the feed gas includes a carbon source and silicon containing hydrocarbons, but also includes nitrogen and oxygen containing hydrocarbons that the present invention does not contemplate.

Mahoney teaches the application of a diamond like carbon and silicon doped coating onto a silicon wafer or metal disk from a Hall-Current ion source apparatus to form magnetic transducers and media for magnetic storage equipment. The present invention does not contemplate the use of the particular ion source apparatus disclosed herein. Further, Mahoney is not directed towards bell cups or other spray apparatus.

U.S.S.N. 10/057,081

18

FGT 1622 PA (199-0868)

Applicants thus respectfully suggest that the combination of the references disclosed in paragraph 5 does not teach the present invention. Further, even assuming that the references do teach the present invention, which the Applicants do not concede, the addition of Kohler and or Mahoney represents improper hindsight, in that the Examiner is picking and choosing among disclosures in non-analogous art in an attempt to produce a combination which allegedly teaches the invention as in claims 24 and 32. As such, claims 24 and 32 are allowable over the cited prior art. Reconsideration of claims 24 and 32 is thus respectfully requested.

Regarding the Examiner's rejection of claim 22 and 34 as listed in Paragraph 6 of the Office Action, Applicants respectfully traverse the Examiner's rejection.

Naik discloses a method for improving the erosion resistance of metallic substrates by first applying a layer of group VI to group VIII or a noble metal (which includes chromium) followed by a layer of a boride, carbide, oxide, or nitride of a metal selected from a Group III to IV element. The Naik reference also teaches the steps of cleaning the surface with detergent, an acidic solution or an alkaline solution.

The present invention, as in modified claim 16, does not utilize a boride, carbide, oxide, or nitride of a metal of a Group III to IV element as a wear resistant coating, nor does it add this wear resistant coating layer to a group VI or VII layer, as in the Naik reference. Instead, it adds a wear resistant coating, preferably carbon based wear resistant coating and more preferably a silicon-doped amorphous carbon coating, coupled to an adhesion promoter material, preferably chrome.

Applicants thus respectfully suggest that the combination of the references disclosed in paragraph 6 does not teach the present invention. Further, even assuming that the references do teach the present invention, which the Applicants do not concede, the addition of Naik to Garg represents improper hindsight, in that the Examiner is

U.S.S.N. 10/057,081

19

FGT 1622 PA (199-0868)

picking and choosing among disclosures to attempt to produce a combination which allegedly teaches the invention as in claims 22 and 34. Here, the Examiner wants to substitute part of the teaching of Naik, without the additional layer, to Garg and then add Tate and Malaczynski to state that claims 22 and 34 are obvious in view of the prior art. This is exactly what the rule against using hindsight references is designed to prevent Examiner's from attempting. As such, claims 24 and 32 are allowable over the cited prior art. Reconsideration of claims 24 and 32 is thus respectfully requested.

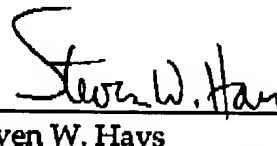
In view of the foregoing amendments and remarks, Applicants submit that claims 8-55 are all allowable. Accordingly, allowance of these claims and passage of the application to issuance are respectfully solicited.

The Commissioner is authorized to charge any additional claim fees, which may be required, or credit any overpayment, to Deposit Account No. 06-1510 or 06-1505 in the name of Ford Global Technologies, L.L.C.

The Examiner is invited to telephone the Applicant's undersigned attorney at (248) 223-9500 if any unresolved matters remain.

Respectfully submitted,

ARTZ & ARTZ, P.C.



Steven W. Hays  
Registration No. 41,823  
28333 Telegraph Road, Suite 250  
Southfield, MI 48034  
(248) 223-9500

Date: August 1, 2003